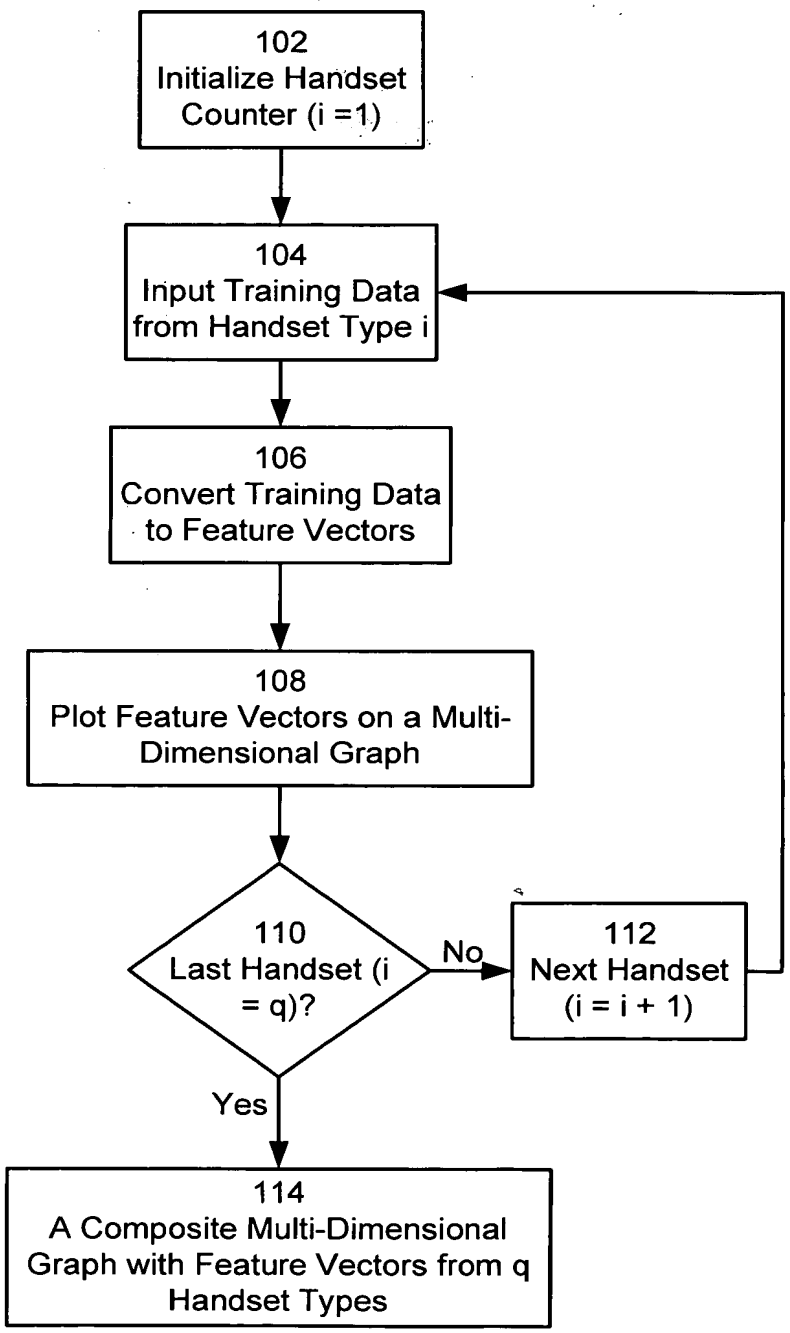
102
Initialize Handset Counter (i =1)
104
Input Training Data from Handset Type i
106
Convert Training Data to Feature Vectors
108
Plot Feature Vectors on a Multi-Dimensional Graph
110
Last Handset (i = q)?
No
112
Next Handset (i = i + 1)
Yes
114
A Composite Multi-Dimensional Graph with Feature Vectors from q Handset Types

FIG. 1

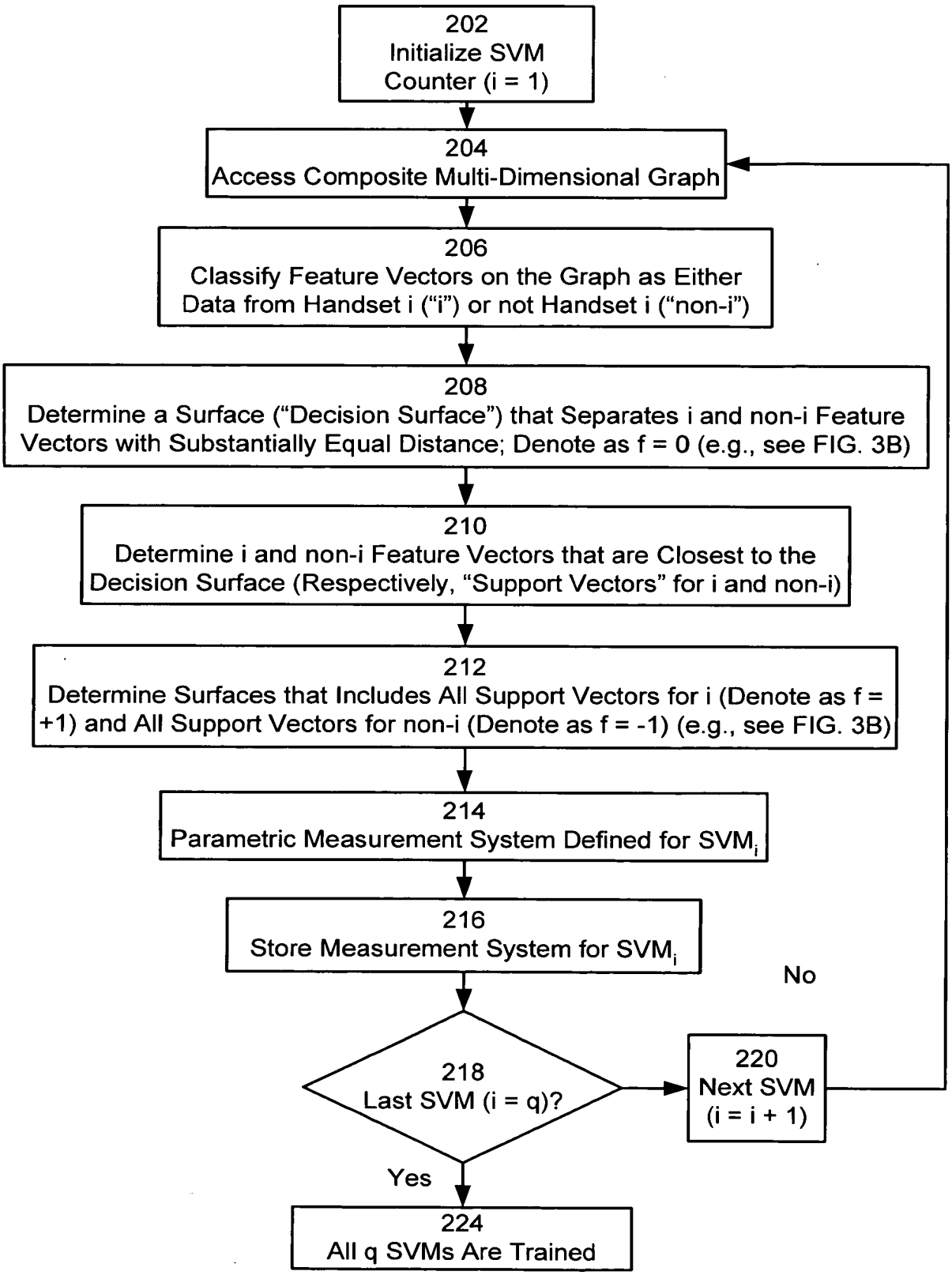
202
Initialize SVM Counter (i = 1)
204
Access Composite Multi-Dimensional Graph
206
Classify Feature Vectors on the Graph as Either Data from Handset i ("i") or not Handset i ("non-i")
208
Determine a Surface ("Decision Surface") that Separates i and non-i Feature Vectors with Substantially Equal Distance; Denote as f = 0 (e.g., see FIG. 3B)
210
Determine i and non-i Feature Vectors that are Closest to the Decision Surface (Respectively, "Support Vectors" for i and non-i)
212
Determine Surfaces that Includes All Support Vectors for i (Denote as f = +1) and All Support Vectors for non-i (Denote as f = -1) (e.g., see FIG. 3B)
214
Parametric Measurement System Defined for SVM$_i$
216
Store Measurement System for SVM$_i$
218
Last SVM (i = q)?
No
220
Next SVM (i = i + 1)
Yes
224
All q SVMs Are Trained

FIG. 2

FIG. 3A

FIG.3B

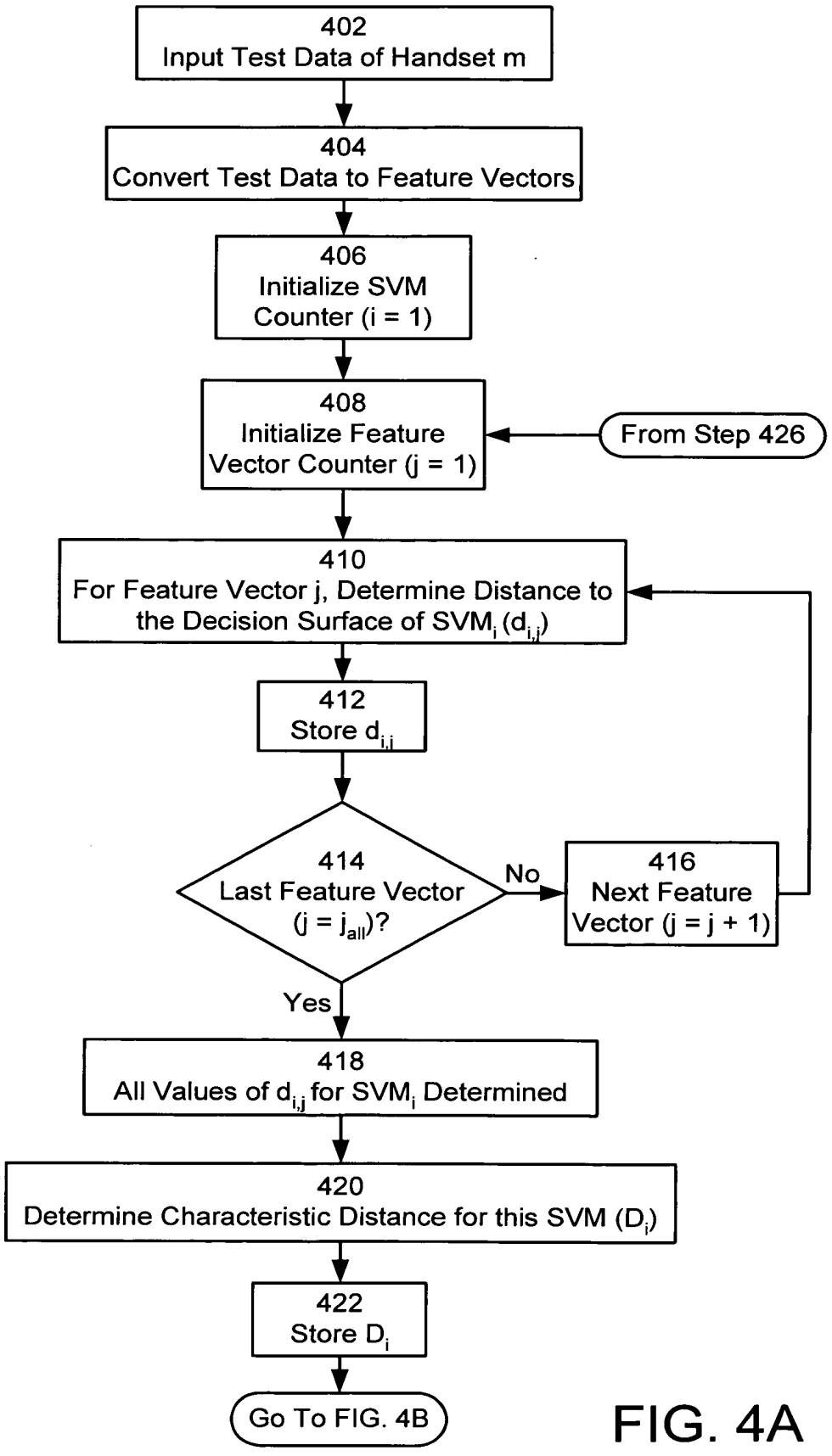
402
Input Test Data of Handset m
404
Convert Test Data to Feature Vectors
406
Initialize SVM Counter (i = 1)
408
Initialize Feature Vector Counter (j = 1)
From Step 426
410
For Feature Vector j, Determine Distance to the Decision Surface of SVM$_i$ ($d_{i,j}$)
412
Store $d_{i,j}$
414
Last Feature Vector ($j = j_{all}$)?
No
416
Next Feature Vector (j = j + 1)
Yes
418
All Values of $d_{i,j}$ for SVM$_i$ Determined
420
Determine Characteristic Distance for this SVM (D_i)
422
Store D_i
Go To FIG. 4B

FIG. 4A

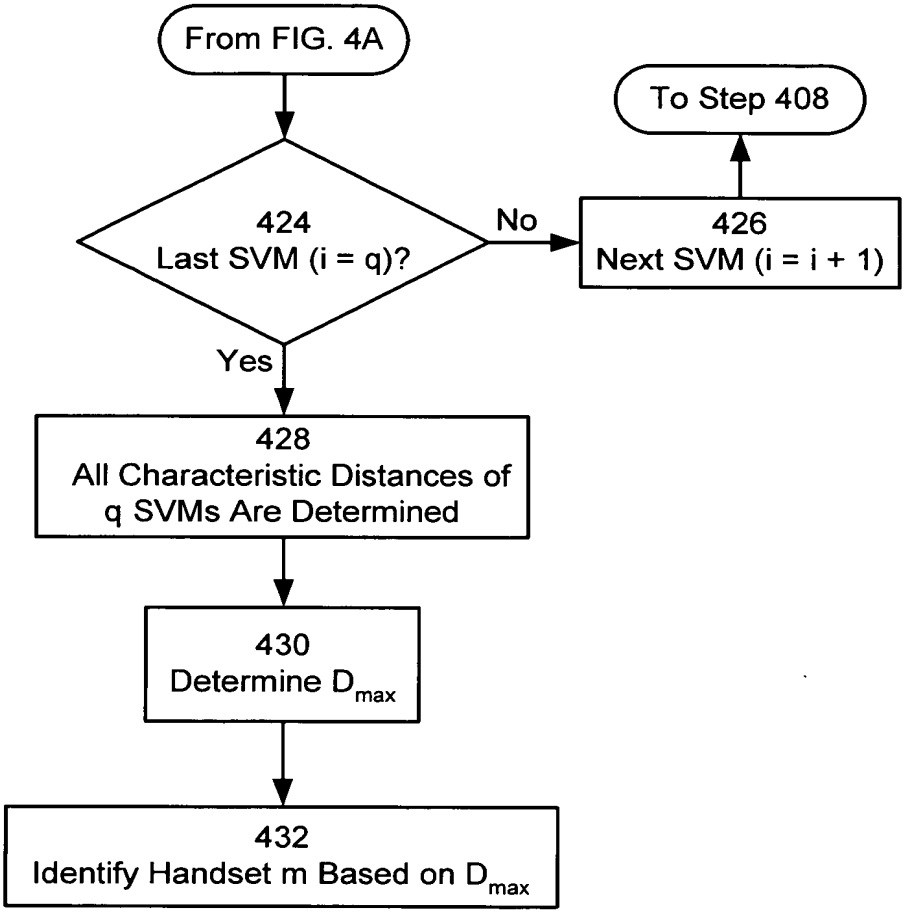
From FIG. 4A
424
Last SVM (i = q)?
No
426
Next SVM (i = i + 1)
To Step 408
Yes
428
All Characteristic Distances of q SVMs Are Determined
430
Determine D_{max}
432
Identify Handset m Based on D_{max}

FIG. 4B

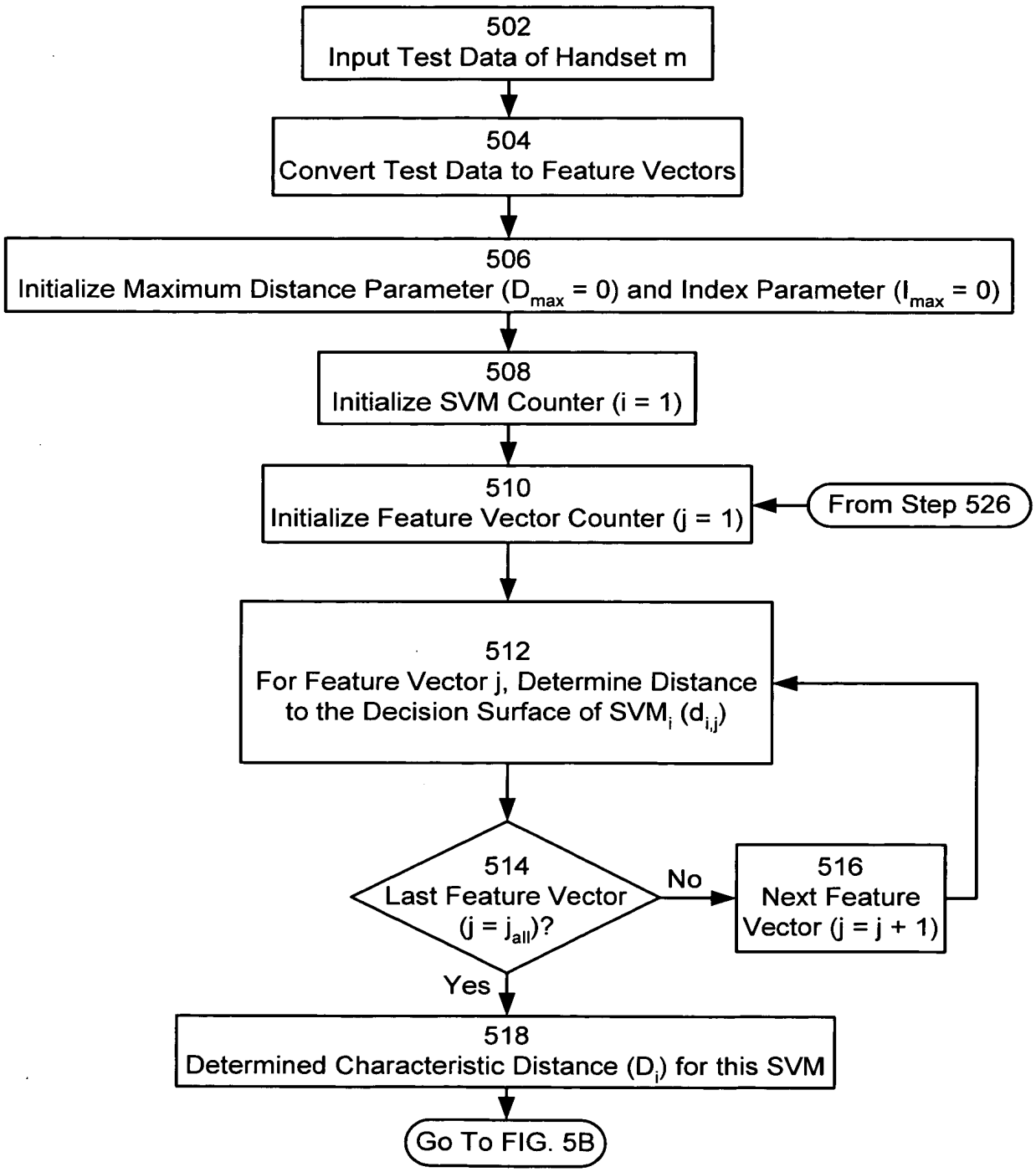
502
Input Test Data of Handset m
504
Convert Test Data to Feature Vectors
506
Initialize Maximum Distance Parameter (D_{max} = 0) and Index Parameter (I_{max} = 0)
508
Initialize SVM Counter (i = 1)
510
Initialize Feature Vector Counter (j = 1)
From Step 526
512
For Feature Vector j, Determine Distance to the Decision Surface of SVM_i ($d_{i,j}$)
514
Last Feature Vector ($j = j_{all}$)?
No
516
Next Feature Vector (j = j + 1)
Yes
518
Determined Characteristic Distance (D_i) for this SVM
Go To FIG. 5B

FIG. 5A

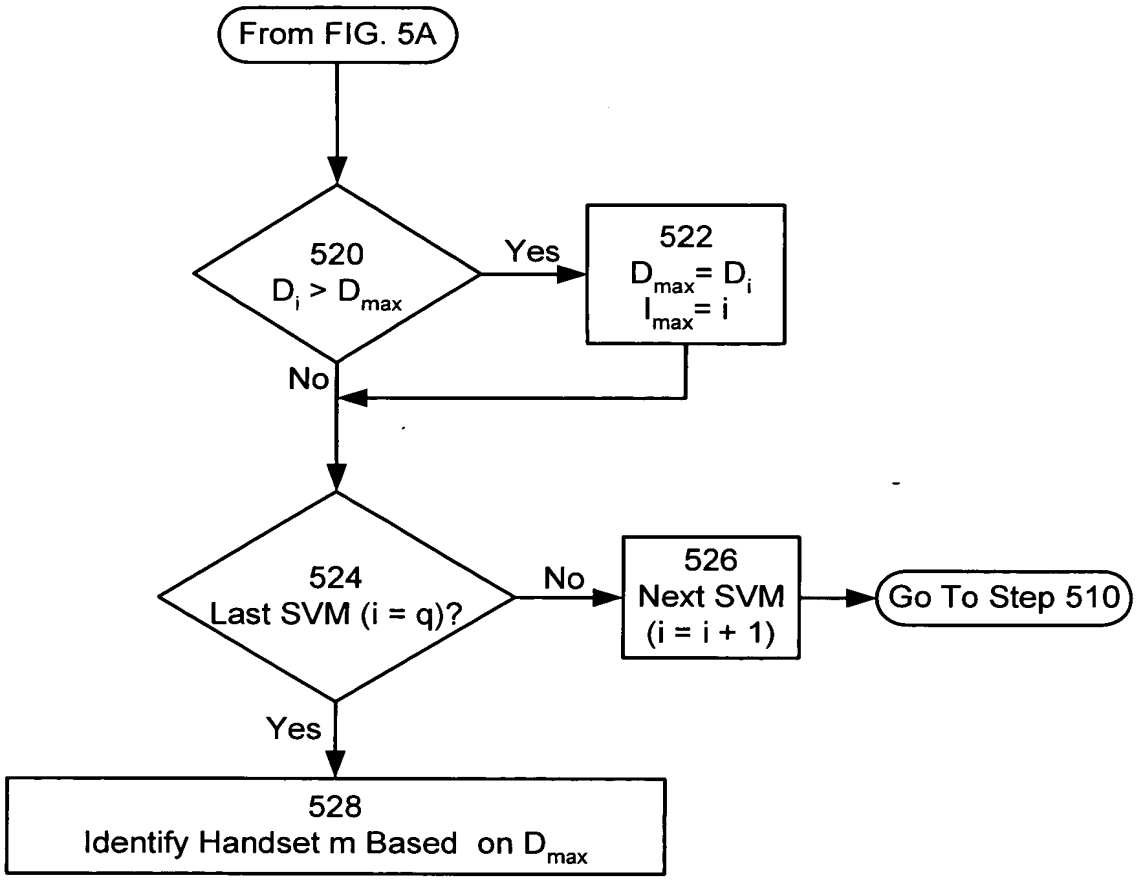
From FIG. 5A
520
$D_i > D_{max}$
Yes
522
$D_{max} = D_i$
$I_{max} = i$
No
524
Last SVM (i = q)?
No
526
Next SVM
(i = i + 1)
Go To Step 510
Yes
528
Identify Handset m Based on D_{max}

FIG. 5B

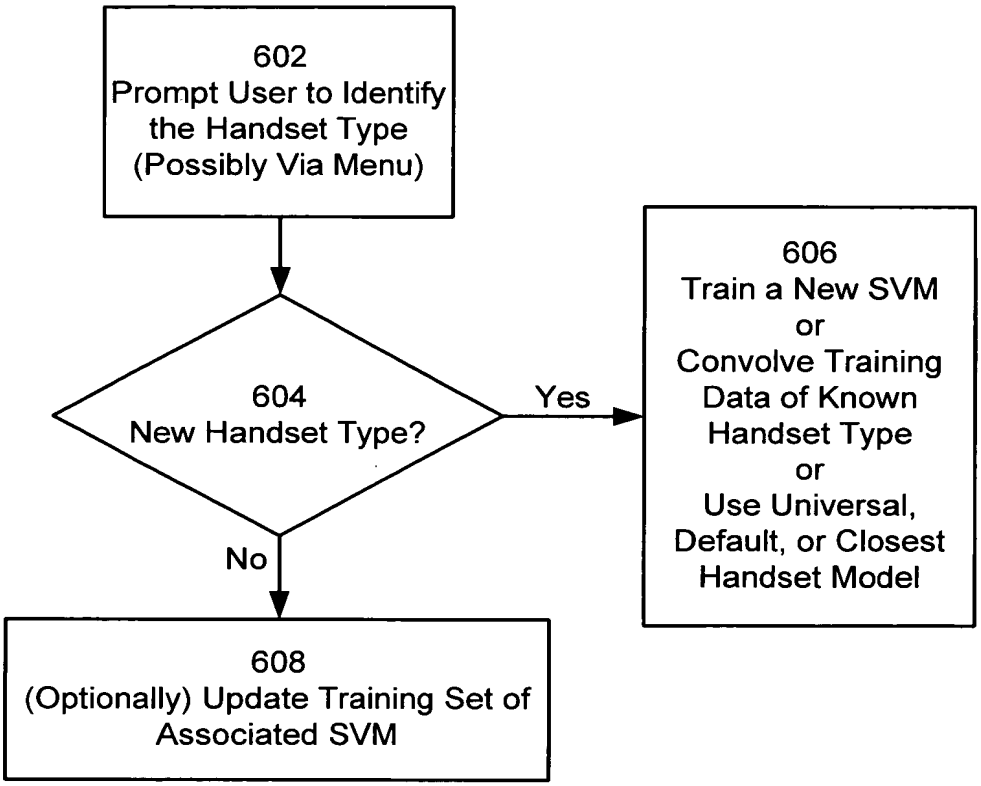
602
Prompt User to Identify the Handset Type (Possibly Via Menu)
604
New Handset Type?
Yes
No
606
Train a New SVM
or
Convolve Training Data of Known Handset Type
or
Use Universal, Default, or Closest Handset Model
608
(Optionally) Update Training Set of Associated SVM

FIG. 6